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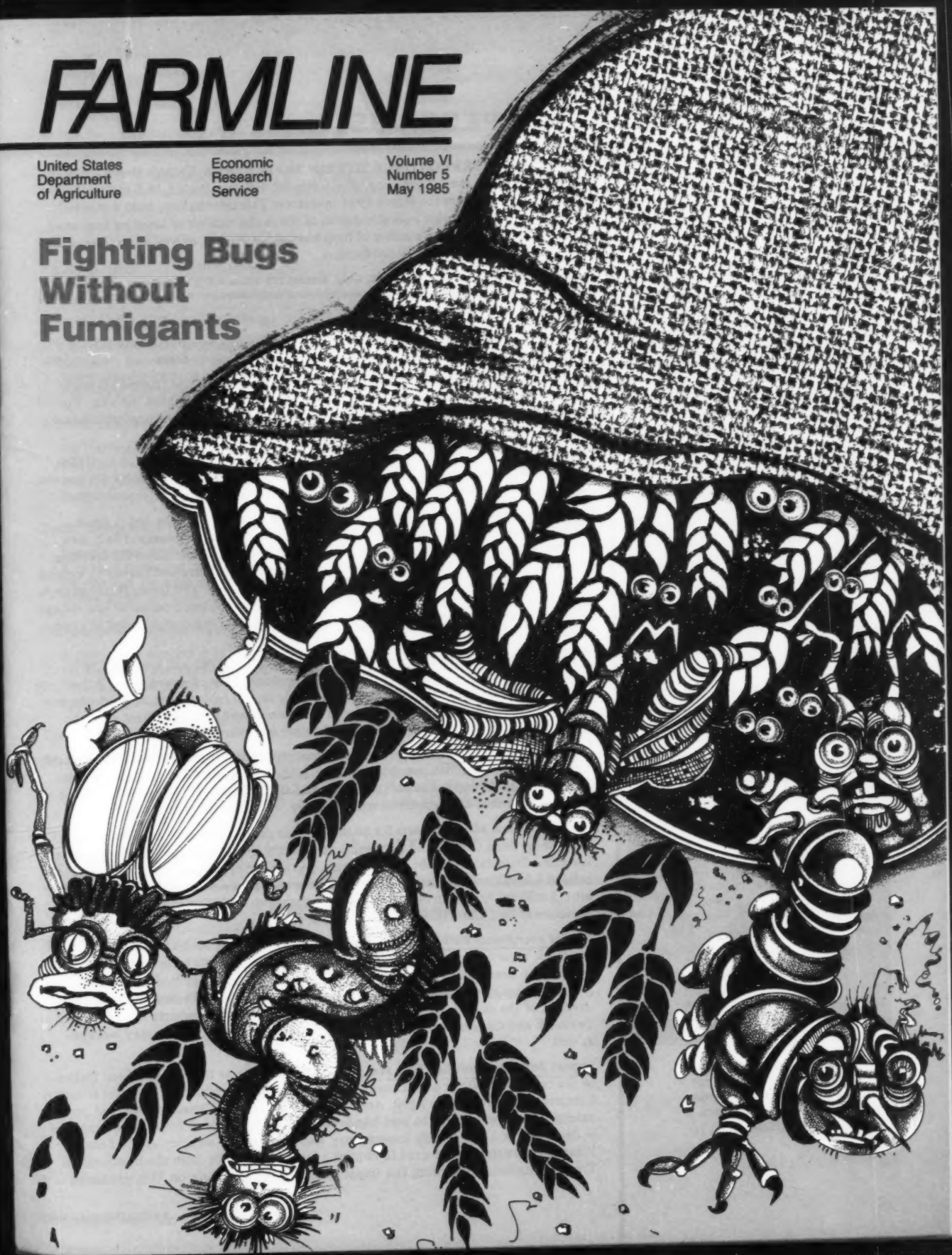
Fighting Bugs Without Fumigants



Editor
Eric Van Chantfort

Assistant Editors
Ellen Banker
Doug Martinez

Editorial Assistant
Martha R. Evans

(202) 447-8915

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PERSPECTIVES

HOG PRODUCERS CONTINUE TO TRIM THEIR HERDS. USDA's March count of hogs and pigs in the 10 top-producing states hit a 9-year low of 39.5 million head. That's down 1% from the March 1984 inventory. This information, from a quarterly survey of producers, also indicates a drop of 4% in the number of breeding hogs available, a drop of 1% in the number of hogs headed for market, as well as declines in farrowing intentions and overall production.

Of breeding herds in the 10 states, only Kansas reported a slight increase of 1%. The others reported declines of:

Georgia	-11%	Iowa	- 2%	Nebraska	- 5%
Illinois	- 4%	Minnesota	- 3%	North Carolina	- 2%
Indiana	- 4%	Missouri	-12%	Ohio	-10%

Farrowing intentions are down, too. Producers said they intended to have 5% fewer sows farrow from March to May than they did during the same period last year. For June through August, a decline of 3% is anticipated. June-August farrowings produce the pig crop that goes to market the first quarter of next year.

For the year, pork production will probably drop around 3%, according to USDA economist Leland Southard of the Economic Research Service. A 3-percent decline was also reported for 1984.

The major reason for continuing liquidation: low returns. Over the last 5 years, Southard says, hog producers have had only 1 year of favorable returns—1982. As a result, producers have sold gilts that otherwise might have been retained for breeding. Southard explains that, in the late 1970's, many producers borrowed heavily to expand or build new hog facilities. Many of these same producers are now facing financial problems because of the combination of large debts and the prolonged period of low returns. For hog producers with crop enterprises, the problem has been compounded by poor returns to crops.

Somewhat higher market prices during the second half of 1985 will substantially increase cash returns when compared with the depressed levels of recent years. But returns will probably not climb enough this year to cover capital replacement costs for the average farrow-to-finish producer. In line with the economies of size, Southard says, the larger producers will generally fare better because of lower production costs.

Higher returns this year may provide some incentive for increased production, especially for larger producers. "It's possible that the liquidation phase of the current hog cycle could come to an end sometime in the second half of the year," Southard says. What happens after that will depend on market prices.

Many producers blame imports for adding to their current financial problems. Imports of live hogs from Canada and pork products, mostly from Canada and Denmark, have increased dramatically in the last few years. During 1984, live hog imports from Canada totaled 1.3 million head, nearly 3 times as many as a year earlier. This year's figure may hit 1.5 million. American producers say Canadians receive unfair subsidies from their government that allow them to undercut U.S. prices.

Similar complaints have been levied against the European Community, specifically Denmark, regarding imports of pork products. In 1984, imports from Denmark totaled 341 million pounds, up 67% from a year earlier. (During 1983, most imports from Denmark were banned because of an outbreak of foot and mouth disease.) However, the strength of the dollar can be targeted as one cause for rising imports from both Denmark and Canada, Southard says. If the dollar weakens, imports may weaken as well.

Import duties on Canadian hogs and pork products could be the real equalizer. Duties—to the tune of $5.30 per cwt (Canadian dollars)—received preliminary approval from the Commerce Department in April. American firms importing Canadian hogs and pork products are now required to post bonds equal to the anticipated duties. Final approval is due by June 10th. Danish imports may also come under scrutiny as the Senate Finance Committee is expected to request a fact-finding study from the International Trade Commission regarding the impact of EC pork products on U.S. producers.

FARMLINE

AGRICULTURE . . . NATURAL RESOURCES . . . RURAL DEVELOPMENT
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Farmers and food processors depend on fumigants in the battle with bugs, but fumigants themselves have been labeled a villain in another battle—the one over safety. How important are fumigants, how should their benefits be weighed against their risks, and what would happen without them?

A Saudi Success Story *by Doug Martinez* 8

For the first time ever, Saudi Arabia will produce more wheat than it can consume. The story of this success has an international flavor mixed with Saudi determination and lots of money. The impact of all this on U.S. agricultural exports—a changed trade relationship, but not necessarily a smaller one.

Beef: Where's the Brand? *by Hilary Sheevers* 11

Brand names worked like a charm for chicken, and the beef industry is considering a similar marketing strategy. It won't be easy, according to one economist we interviewed. He says that the beef industry has some major obstacles to overcome before it can sell fresh, brand name beef directly to consumers.

Dairy Industry Moves West for Greener Pastures *by Eric Van Chantfort* 12

A growing proportion of U.S. milk production is shifting to the West and Southwest from some of the more traditional dairy states. The industry seems to be pursuing population and profits with huge, high-tech dairies that get more milk per cow at a lower investment cost.

Female Farmers Gain More Than a Foothold *by Doug Martinez* 17

The number of women farmers is growing, even as the overall farm count is coming down. Many are widows keeping the family farm going, and some are young women who have the skills and confidence to fight for a place in a male-dominated profession. Statistics from the latest agricultural census paint a profile of women who run farms.

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Fighting Bugs Without Fumigants

Agricultural fumigants. Farmers depend on them in the battle against bugs.

Fumigants are gaseous pesticides that can be sprayed in the soil before planting or on crops after harvesting. They are effective and enduring, killing insects and eggs for up to a year. Most domestically produced fruits and grains are treated with some protective process for safe storage and shipment. Fumigants are often the choice.

Food processors, particularly those who manufacture grain-based products, also use these chemicals to ensure that their facilities and equipment are free of insects.

While versatile and effective in the fight against insects, fumigants have been labeled the villain in another battle: the one over safety. The issues, however, are varied and complicated, ranging from exposure hazards for farmworkers to residue risks for consumers to the suitability of alternatives for farmers and food processors.

The alternatives question is particularly interesting to USDA economist John Baritelle of the Economic Research Service. Baritelle works out of the University of California, Riverside.

"Some researchers will tell you that there are no acceptable alternatives, particularly if we want to continue producing the volume and quality of crops we do now using fumigants," he says. "But others say there are plenty of substitutes. The real issues involve cost, management flexibility, and consumer acceptance, among other things."

One thing is sure. If there are no fumigants, there will have to be alternatives. A brief lesson on the role fumigants have in agriculture will help explain why.

The Fumigant Story

The primary use of fumigants is to control insect infestation in harvested grain and fruit crops, according to USDA scientist Richard Parry of the Agricultural Research Service. In addition, fumigants are sometimes applied directly to the soil before planting in hot, humid areas where soil pests are a problem.

The primary use of fumigants is to control insect infestation in harvested grain and fruit crops.

Other uses of these chemicals are not uncommon, Parry adds. Methyl bromide, a good example because of its wide application as a fumigant, is also used to degrease wool, to extract oils from nuts and seeds, as a fungicide for fruit trees and vineyards, as a refrigerant, and sometimes, to kill rodents.

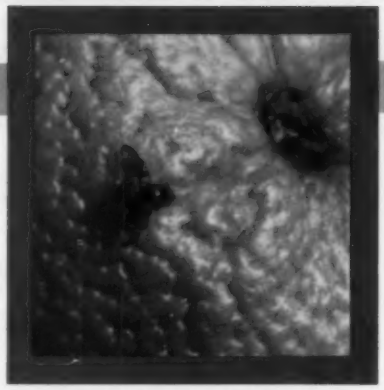
For harvested crops, Parry says, fumigation generally works like this: The commodities are placed in a sealed facility and the fumigant gas is piped in. It filters through the grain or produce and begins working immediately. It is effective for up to a year.

The procedure sounds simple enough, but simple it is not. The major reason is that fumigants are toxic and are classified as "restricted use chemicals" by the Environmental Protection Agency (EPA). Farmers must be certified as applicators by EPA to handle the chemicals, which carry strong warning labels regarding their specific uses, application procedures, and needed precautions.

Even so, there have been accidents. Although many involve farmers and hired farmworkers, exposure is not limited to the fields or storage facilities. Commodities change ownership many times before reaching a final destination. Mix-ups in labeling can cause safety hazards for handlers.

Quality Control

Nonetheless, fumigation is essential to maintaining the quality of commodities because insect infestation can be so devastating.



Mediterranean fruit fly infestations have been a serious problem for citrus growers.

Many less developed countries, without access to these chemicals, lose up to one-third of their crops to rodents and insects, Parry says.

According to a report on grain fumigation recently issued by the U.S. General Accounting Office (GAO), even low levels of insect infestation can develop into damaging populations very quickly. One grain beetle, the khapra, can reduce a 40-pound sack of grain to 10 pounds in 3 months, says GAO accountant Ralph Lameraux, who co-authored the fumigant report. "Basically, all that's left are the beetles," Lameraux says.

Temperature, moisture, and grain dockage or dust are conditions that combine to encourage insect infestation, Lameraux continues, and some of these factors cannot easily be controlled as commodities travel through the marketing chain.

The GAO report examines the involvement of government agencies in all aspects of fumigant regulation. The conclusion: More research is needed.

The U.S. position in world markets depends on quality, Lameraux says. And, until new technologies can be adapted to the storage and marketing of crops, quality may depend on fumigants.

U.S. consumers also expect quality. Americans would simply not tolerate insect infestation in food, Parry says. Fumigation provides a dependable insurance against insects.

These magnified kernels of wheat are infested with rice weevils.

Stubborn Residues

What fumigants can leave behind, however, are residues. Residues are not actually supposed to be in food, according to USDA's Baritelle, who explains that the fumigant should gradually dissipate as the product is stored and exposed to air. But all fumigants don't completely disappear all the time, he says.

"The reasons could be improper application, storage, transportation, temperature, or moisture levels, or a combination of these factors and plenty of others," Baritelle says, noting that it would be very difficult, maybe impossible, to pinpoint an exact cause in many cases.

When residues are found in foods, people get jittery. Large amounts of residues can be toxic because fumigants themselves are toxic.

Determining exactly what levels of residues constitute a threat to public health is the responsibility of EPA, while the Food and Drug Administration (FDA) is responsible for enforcing the standards.

Last year, residues in some cereals and cake mixes caused FDA to ban the use of the fumigant ethelyne dibromide, commonly known as EDB. This was not the first time a fumigant had been banned. The fumigant DBCP was banned in 1977 for much the same reason.

Since last year's ban of EDB, officials at the EPA decided to reexamine all registered fumigants.

What replaced these fumigants? Other fumigants, according to most researchers. Farmers can currently choose from 13, although most have limited applications for certain crops and certain pests.

Like other pesticides, herbicides, and fungicides, fumigants must be registered with EPA, specifically with the Office of Pesticide Programs that compiles the results of safety and toxicity tests and recommends a fumigant's registration. Since last year's ban of EDB, officials at the EPA decided to reexamine all registered fumigants.

The process is long and involves examining the results of hundreds of tests on each chemical for toxicity, exposure, residue problems, and efficacy, along with lists of possible alternatives, and economic impact statements that outline the financial consequences of banning the chemical.

No one knows if more fumigants will be banned as a result of the examinations. "Researchers will weigh the benefits and risks associated with each one before making any recommendation," says EPA economist Roger Holtorf.

But, according to USDA's Baritelle, even the notion of a ban has compelled some researchers to ask an important question: Could agriculture and food processing survive without fumigants?

Baritelle says, "In the long run, yes," but he qualifies his answer. "Agriculture would change considerably because alternatives would have to be used. Of the alternatives, some have not yet been commercially tested and, right now, most cost considerably more than fumigation. What we're really talking about is a change in the marketing structure of how some crops are grown and how others are preserved."

Fighting Bugs Without Fumigants

There is no quick fix. "None of the alternatives would be easy to implement immediately on a large scale," Baritelle says.

"Even methods that look good in pilot tests have shown some problems when implemented on a commercial basis. This is not to say that these alternatives will never be adopted, but there is definitely a need for additional research."

USDA scientist Parry agrees, adding that, "It's hard to talk in the broadest sense. You have to narrow it down to a specific commodity and a specific pest and a specific market."

The following are alternatives that both researchers consider most promising:

- *Inert atmospheres or oxygenless air.* With this method, a lethal atmosphere is created by burning natural gas or propane, either of which will remove the oxygen from the air. Machinery and equipment costs are considerable, Baritelle says, and the procedure requires that the storage facility be reasonably air tight.

It's not an alternative that would be used on individual farms, but probably in a central processing area. Large volumes could compensate for initial cost. Still, retrofitting existing storage facilities is an expensive undertaking.

Another disadvantage is that the process takes 3 to 7 days to kill insects compared with the immediate action of fumigants. "This is a considerable drawback to management," Baritelle says.

• *Carbon dioxide treatment.* This is another gas treatment that is used extensively in Australia. "It's very effective," Baritelle says, "and quickly suffocates the insects and eggs." Like inert air, the process requires a sealed facility, although the costs involved are higher than those for inert air.

• *Irradiation.* This is a food preservation process that involves the use of controlled doses of ionizing radiation in the form of x-rays, gamma rays, or high energy electrons to kill insects and reduce the number of microorganisms that cause spoilage. The process does not make food radioactive. It is currently used in at least 18 countries and has been approved in the United States for use on wheat, wheat flour, potatoes, and spices. A proposal that would extend the use of irradiation to fresh fruits and vegetables is currently under consideration by the Food and Drug Administration.

The initial costs for facilities and equipment are considerable, Baritelle says. The use of irradiation would certainly require that produce and grains be shipped to centrally located facilities. Consumer acceptance is another issue, he adds. Even if irradiation proves to be the most useful process, consumer acceptance is key to its commercial use.

• *Cold storage* stops or slows down the feeding and reproductive process of insects, although it usually does not kill them. One problem is that it is very expensive because of the cost of energy and the need for a well-insulated facility. It is currently used commercially on apples, walnuts, and dates, and much experimentation has been done with other fruits. Under lab conditions, it works.

The khapra, a beetle that usually infests harvested grain, can reduce a 40-pound sack of grain to 10 pounds in 3 months.

Many farmers are skeptical that the alternatives will prove to be reliable and economical substitutes.

However, some large-scale tests have presented major problems. According to Parry, scientists recently tried the cold storage process to control Caribbean fruit fly infestations of harvested Florida grapefruit during shipment to Japan on an ocean tanker. What worked well in the lab was inefficient in the commercial tanker. Temperatures and humidity could not be maintained during shipping. The result: more than 90 percent loss of the grapefruit shipment.

Although the process appears promising, more research is needed, Parry says.

• *Heat treatment.* Not much work has been done on this process yet, Baritelle says, but the theory is that treatment at a high temperature for a short period of time could effectively eradicate insect infestation. The major problem is that heat treatments could change the chemical composition of food, so it is not a plausible alternative for all commodities. Walnuts, for instance, turn rancid if heated.

Heat treatment is already used on prunes. When plums are dehydrated at 180°-185°, the process also kills all insects and eggs. And work is also being done with a combination of heat treatment and flash freezing.

Will fumigants ultimately be replaced by one, some, or all of these alternatives?

That depends on costs, how easy or difficult the alternatives are for farmers and food processors to use, and how consumers will react to alternatives like irradiation, Baritelle says.

One other factor will also play a part. "Do we really need the alternatives?" Parry asks. While some scientists would respond with an emphatic "yes," Parry seems to be reserving judgment. "There is a wide variety of opinion on the actual hazards posed by fumigants. Estimating the toxicological risk in humans is a relatively new science without a firm data base for predicting safety." Using the results of tests on laboratory animals, researchers estimate the danger to humans. But still, there is no real consensus on how much of a residue is too much, Parry adds.

And there are the concerns of farmers themselves. Many are skeptical that the alternatives will prove to be reliable and economical substitutes, Baritelle says. "After all, fumigants are a known commodity, relatively inexpensive, and readily available. Almost all the alternatives are still in the testing stages."

However, Baritelle adds, researchers must be ready. "At one time, electricity was in the testing stage, too." □

[*Based on interviews with economists John Baritelle and John Schaub of the Natural Resource Economics Division, Economic Research Service; scientist Richard Parry of USDA's Agricultural Research Service; economists Bob Torla and Roger Holtorf of the Environmental Protection Agency; and accountant Ralph Lameraux of the U.S. General Accounting Office.*]

REPORTS IN THE NEWS

State-by-State Economic Profile

California led the nation with $13.5 billion in 1983 farm cash receipts from all commodities.

Cash receipts by state for major crops and livestock is just one of the categories of statistics to be found in a report on 1983 financial indicators of the farm sector. The report, by USDA's Economic Research Service, shows that the nation's most populous state also was the leader in sales of all crops and ranked third for all livestock.

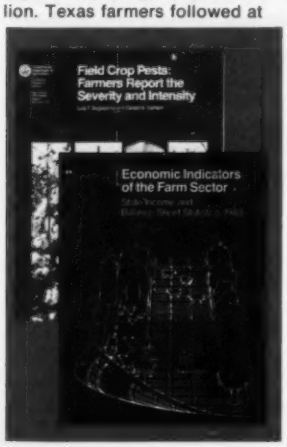
Iowa came in second to California by earning $9.3 billion in cash receipts, ranking second in sales of livestock and third in crop sales. It also ranked first in hog and soybean sales and second in corn. Texas followed in third place with cash receipts for all commodities of nearly $9 billion.

The balance sheet in 1983 shows that the distribution of total cash receipts remained fairly stable. The top five states had 35 percent of total cash receipts in 1973, 34 percent in 1979, and 33 percent in 1983.

California farmers also led in the category of production expenses, paying out $11.5 billion. Texas farmers followed at $9.9 billion, and Iowa farmers were third with $9.2 billion in production expenses.

This statistical report provides a comprehensive financial profile of the farm sector, with cash receipts, farm income, production expenses, and farm debts and assets broken down on a state-by-state basis.

Economic Indicators of the Farm Sector: State Income and Balance Sheet Statistics, 1983. *(Published January 1985; 197 pages, mostly data tables; GPO Stock No. 001-019-72074-3; $5.50.)*



Of Pests and Pesticides

Farmers choose their pesticides and pest control strategies according to the severity and intensity of the insects, weeds, and diseases that threaten their crops.

This report, based on surveys of farmers, provides national and regional information on the pesticide types and applications, acres treated, and major target pests for corn, soybeans, cotton, wheat, small grains, sorghum, tobacco, and hay.

Corn: Corn rootworm accounted for 58 percent of the planted acres treated for insects in 1980, and corn borers for 24 percent. Foxtails and cockleburs were the most frequently cited problem weeds. Alachlor was the most common choice for foxtails, as atrazine was for cockleburs.

Soybeans: Weeds were the most severe pest category for soybeans. Major species were cockleburs, crabgrass, johnsongrass, and morning glory in the Southeast and Delta states, and foxtails and cockleburs in the Corn Belt. The most common herbicides reported were trifluralin, bentazone, alachlor, and metribuzin.

Cotton: Pest problems were more severe and intense for cotton than for any other field crop. Bollworms were the worst insect pest of the Southeast, but fleahoppers were worst in the Southwest and spider mites were the bane of cotton farmers in the West. Cockleburs and broadleaf were the major target weeds.

Tobacco: After cotton, the tobacco crop had the highest multiple applications of pesticides, with diseases more severe than for any other surveyed crop. Ferbam was the most commonly used fungicide applied against blue mold and blight. Tobacco budworms were the number one insect pest, often requiring several applications of methonyl. Grasses, mainly crabgrass, were the leading weed target.

Field Crop Pests: Farmers Report the Severity and Intensity *by Luis Suguiyama and Gerald Carlson. (Published February 1985; 52 pages, including a text summary and extensive data tables; GPO Stock No. 001-019-00377-4; $2.25.)*

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Desert Dunes to Fertile Fields: A Saudi Success Story

For the first time ever, the oil kingdom of Saudi Arabia is expected to produce more bushels of wheat than it can consume.

"The goal of becoming self-sufficient in wheat will be more than met this year," says economist John Parker of USDA's Economic Research Service. "Saudi farmers are expected to harvest about 30 percent more than the needs of the nation's bakeries."

The story of this success, says Parker, has an international flavor mixed with Saudi determination. It involves high-yielding wheat varieties from Mexico and India, as well as American technology and experts that have enabled the Saudis to establish large commercial wheat farms.

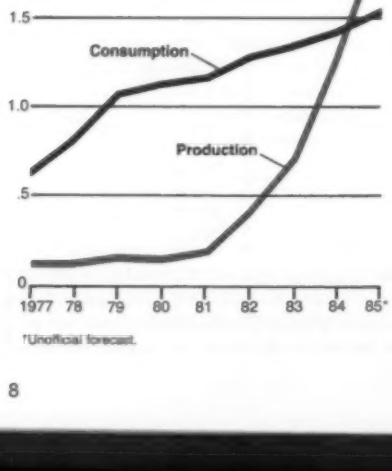
Most of all, perhaps, it involves money.

"Investments in agriculture accelerated in the early 1980's, and wheat was the bonanza," says Parker. Some $2 billion has been spent for wheat development alone in the last several years.

The changing look of some Saudi landscapes from sand dunes to fertile fields also means a changing trade relationship with the United States. U.S. wheat exports to the Arab nation are declining, but sales of U.S. wheat flour rose temporarily in 1984—apparently because bakeries needed the special types of flour supplied by the United States.

Saudi farmers this year are expected to harvest about 30 percent more wheat than is needed by the nation's bakeries.
Photo courtesy of Aramco World Magazine.

Saudi Arabia's Wheat Harvest in 1985 Will More Than Meet Domestic Needs



*Unofficial forecast.

"It appears that a two-way trade is likely to develop rather than a cessation of all trade in wheat and flour," says Parker. "Certain types of wheat and flour will be imported as they are needed, and some Saudi wheat and flour will be exported to nearby countries under commercial terms or special food aid arrangements."

The United States is expected to remain a major supplier of other agricultural products, as well as the machinery and equipment needed to operate Saudi farms. Although wheat trade may not recover to past levels, recent gains for U.S. corn sales have offset the decline in value for wheat.

Overflowing Wheat Harvests

Saudi Arabia's wheat harvest may approach 2 million tons this year, a tenfold increase since 1981.

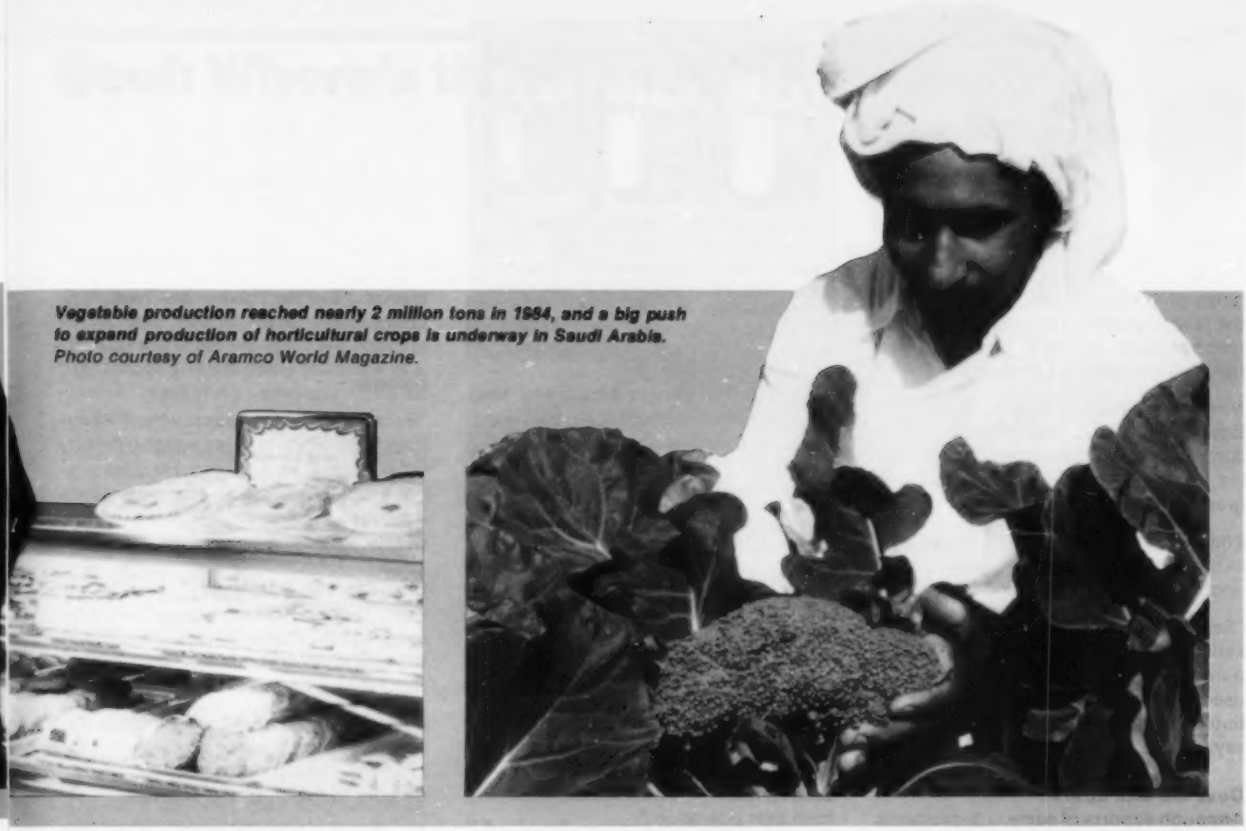
"The average yield in 1983 was about 38.6 bushels per acre, roughly the same as the U.S. yield," says Parker. "This has been attained through the use of improved varieties, modern irrigation equipment, and ample applications of subsidized fertilizer."

The Saudis have been aided by the fact that their "desert soil is more responsive to irrigation technology than say, the Sahara desert, which would probably take a longer time to develop."

Moreover, the Saudis haven't held back on fertilizer use.

"Fortunately for Saudi Arabia, oil byproducts are used to produce fertilizer, and Saudi Arabia has a lot of oil. This is another reason why agricultural production has been pushed," Parker says.

In 1984, wheat production nearly doubled to approximately 1.3 million tons, up from 700,000 tons in 1983, 412,000 tons in 1982, and only 187,000 tons in 1981. Saudi Arabia has its own wheat belt, and wheat plantings now occupy about half of the country's irrigated land during the winter and spring. For 1984, the increase in production alone was more than the combined output for the 3 years from 1979 to 1981.



Vegetable production reached nearly 2 million tons in 1984, and a big push to expand production of horticultural crops is underway in Saudi Arabia. *Photo courtesy of Aramco World Magazine.*

Americans on Saudi Farms

Americans have been part of the Saudi success story. In addition to technical assistance paid for by the Saudis and technology purchased from the United States and other countries, many Americans with agricultural experience have been hired by the Saudis to run Saudi farms.

"These American farmers are getting well paid for doing the work they like to do, and their employers, the Saudi wheat producers, are reaping a harvest of plenty, both in terms of grain and money," says Parker.

The push for greater self-reliance in food production is no sudden whim on the part of the Saudis, and it's likely they would have turned elsewhere had they not been able to purchase American technology and expertise.

"Being more self-sufficient in food means the *food for crude* issue is not put on the table for discussion with regard to oil prices," he says. "The Saudis have been concerned about importing so much of their food, particularly after the oil pricing strategies they've employed since 1973."

The costs of converting desert into cropland have been very high, but they feel it's worth the big cost, he adds. In many other countries, the expense would have been prohibitive.

In just one year, 1983, the country's Agricultural Credit Bank loaned more than $1 billion to farmers. Government subsidies paid nearly half the cost of farm machinery. And Saudi imports of irrigation equipment, much of it from the United States, were valued at over $500 million between 1981 and 1984.

"Subsidies for developing new cropland and the high domestic prices for wheat contributed to a large increase in acreage harvested. Total wheat acreage harvested was estimated at 778,000 acres in 1984," Parker notes.

A Bonanza Beyond Wheat

Now the time may be ripe for spreading the investment in agriculture beyond wheat.

"It is obvious that some of the cropland developed with modern irrigation technology should be shifted to other crops," Parker says. "Vegetable production was nearly 2 million tons in 1984, but production could rise to 4 million tons by 1989 if land is taken out of wheat and used for production of the most profitable vegetable crops."

Certainly, some significant efforts are already being made.

"A big push to expand production of horticultural crops is now underway," he says. "Many projects involve increasing the production of greenhouse vegetables. There is also an initiative to produce some vegetables near all major cities and towns."

Modern roads and transportation equipment allow vegetable producers to efficiently market their crop where the best prices are paid.

The increased priority given to vegetable production may curb imports spurred by the earlier emphasis on wheat, says Parker.

"Imports of fresh and preserved vegetables by Saudi Arabia increased rapidly in the early 1980's," he says. "Apparently the marked move to wheat caused a crowding out for some vegetables, particularly onions. Farmers found it more lucrative to grow wheat on newly irri-

gated land than vegetables because of the favorable wheat price and the use of mechanized farming that greatly reduced the need for manual labor."

More of that foreign labor—mainly from Egypt, the Yemen Arab Republic, and Jordan—will be coming into Saudi Arabia to work in vegetable fields and greenhouses.

The growing importance of vegetables in Saudi agriculture can be measured in another way—money.

"Saudi government investments in marketing facilities and subsidies for the purchase of farm machinery and trucks used to haul farm produce have contributed to vegetable production," Parker says.

Does the U.S. Lose?

Although exports of some U.S. products have been hurt by the Saudi progress in agriculture, other products have actually benefited. "The total value of U.S. farm sales to Saudi Arabia hasn't really changed," says Parker. "Exports of new items to the Saudi market are offsetting the loss of traditional products like wheat."

Carving out a share of the competitive Saudi market for processed foods requires aggressive effort and attention to such details as proper labeling and packaging. *Photo courtesy of Aramco World Magazine.*

Among the big gainers is the entire "feed meal complex—barley, corn, soybeans. Fruits and vegetables have also been selling well, and a brisk trade has begun in seed wheat."

With only the "composition mix changing, the bottom line has largely remained the same," he says. "Direct U.S. farm sales to Saudi Arabia have been in the $500 million range and should stay at least at that level. Much of the transit trade (through third countries) may shift to direct exports as Saudi ports adapt to new needs. For example, bulk barley previously sent to Belgium for bagging can now be sent directly to Saudi ports where new facilities will perform that operation."

But sales may also go up, if the U.S. can carve out a share of the competitive market in processed foods, Parker says.

"The number of middle-class foreign workers is increasing, so the purchasing power per guest worker is picking up," he says. "But this will not be an easy market to enter given the high U.S. dollar."

The technical ties may also become broader.

"Because of the success in wheat, American technology is being sought in many other areas," Parker says. He cites soybean crushing as just one area where American expertise seems sure to be widely employed.

Limits to Self-Sufficiency

Even the best outside expertise, however, won't be able to totally overcome the limits to development imposed by natural and financial constraints.

Limited irrigation water supplies, for instance, pose a major problem. For the moment, desalinated sea water may not be able to make up the shortfall.

But the greatest difficulty may lie with the Saudi's greatest asset—money. Declining oil prices have meant revenues are down, trimming the prospects for achieving some ambitious development plans. Saudi coffers have also been depleted by billions of dollars of aid to Iraq, which is locked in a drawn-out war with Iran.

Parker sees the cutback most plainly in the curtailment "of infrastructure development plans for such things as airports and roads. Construction in 1984 was just one-third the level of that in 1981."

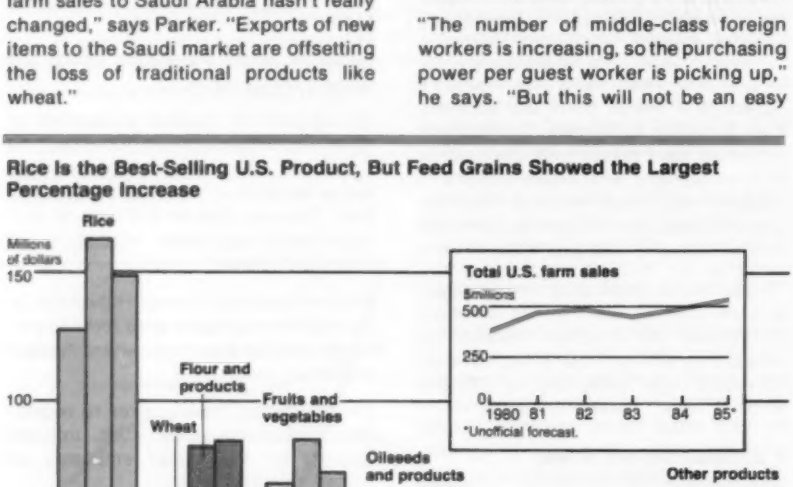
Moreover, the progressive picture presented by Saudi agriculture today should not be seen as symbolizing Arab agricultural development generally.

"Saudi Arabia is a unique case," says Parker. "They have the money for subsidies and all the inputs of technology and American experts that they've needed."

"In other parts of the Arab World," he continues, "producing food at a faster pace than population growth is a struggle."□

[Based on information provided by economist John Parker of the International Economics Division, Economic Research Service.]

Rice Is the Best-Selling U.S. Product, But Feed Grains Showed the Largest Percentage Increase



Beef: Where's the Brand?

Vacuum-packed beef may not be the marketing answer in retail beef sales, but it's quite suitable for large-scale kitchens.

Frank Perdue did it. Holly Farms did it, too. Brand name poultry has made a reputation for itself, and now the beef industry is weighing the value of a similar marketing strategy for its product.

"Actually, the idea has been around a long time," says livestock specialist Terry Crawford of the Economic Research Service. "But the industry needs to overcome some major problems before it can sell brand name beef directly to consumers," he adds.

The key stumbling block is the beef industry's lack of central packagers. In the poultry industry, companies like Perdue control production and marketing from the farm to packaging and delivery to the supermarket's distribution center. And they not only put their label on a chicken, they also advertise and create demand for their brands.

Beef, however, is cut and packaged at a retail store, and the store puts its name on the product. There's little incentive for stores to sell packaged, brand name beef. Stores try to create customer loyalty by selling beef under their label. They fear that if all stores carried the same beef brands, consumers would not identify quality beef with a particular store, Crawford explains.

Poultry processors forced stores to carry brand name poultry by running large advertising campaigns that created consumer demand. "Without brand identity on the packaging, large beef processors cannot capture the benefits of a national advertising campaign," says Crawford.

And there's another problem connected with processor packaging of beef. Current store packaging lets in small amounts of oxygen and bacteria, reducing beef's shelf life. Processors can vacuum wrap beef to keep out bacteria, but vacuum-packaged beef is not attractive. "In most vacuum packaging, beef appears bluish red until it's unwrapped. It turns red when oxygen strikes it," Crawford explains. Consumers may not readily accept bluish-red beef because they connect bright red beef with freshness and quality. In poultry, vacuum packaging isn't a problem because the pale pink or yellow meat color is not significantly different between an exposed chicken and one in a vacuum bag.

The beef industry needs to overcome some major problems before it can sell brand name beef directly to consumers.

The beef industry has considered freezing beef, but that option also has its disadvantages. Many consumers avoid frozen beef because of its unappetizing dark color. Further, some consumers believe that it's not as good as fresh beef. "Consumers may freeze beef they buy fresh, but many have a prejudice against buying it already frozen," Crawford says.

However, one market for brand name beef already exists and may be open for further development. Many restaurants and hotels use some vacuum-packed beef with recognized brand names, such as Monfort of Colorado and Swift. Restaurants and hotels prefer portion-controlled, vacuum-packed beef because it stays fresh and is shipped in large quantities, usually about 40-60 pounds, that are especially convenient for their needs. Most importantly, consumers don't see its initial bluish color.

Another marketing possibility may be tray-ready beef, according to Crawford. Here, a processor cuts and trims a large section of beef, such as a loin, and then reassembles and vacuum packs it. The package goes to retail stores where employees simply separate the cuts and repackage them for consumers. The meat turns red during repackaging and is put out under the store's label.

Retailers like this system because they can differentiate their product while taking advantage of central, less skilled, and often less costly meat cutters.

But this is still a long way from the poultry industry's brand names. "Unless consumers are willing to judge meat on something other than bright red color," Crawford says, "I don't expect to soon see brand name fresh beef as a major force in stores."□

[*Based on information provided by Terry Crawford of the National Economics Division, Economic Research Service.*]

Moving West: The Dairy Industry Finds Greener Pastures

Dairy farming is usually associated with small herds of holsteins and red barns dotting the rolling hills and fertile flatlands of the states surrounding the Great Lakes—Wisconsin, New York, Minnesota, Pennsylvania, Michigan, Ohio, and into New England and the Midwest.

Today, however, it would also be accurate to picture a 1,000-cow drylot dairy closer to the Gulf of Mexico or Pacific Coast. California, Texas, and Washington are far removed from what might be called the *dairy belt*, yet they each now rank among the ten leading dairy states.

In fact, a growing proportion of U.S. milk production is gradually shifting to the West and Southwest from some of the more traditional dairy states, particularly those in the nation's midsection. The shift began about three decades ago and has accelerated in the last 20 years, according to economist Richard Fallert of USDA's Economic Research Service.

Although seven of the top ten dairy states are still in the northeastern quarter of the nation, several states outside this area are moving up in the rankings. The trend is evident in USDA statistics:

- Eleven states increased their milk production by more than 25 percent between 1970 and 1984. Except for Wisconsin and Pennsylvania, all are in the West or Southwest.
- Twenty states showed declines in milk production over the same period. Fully one-third of these are in the central grain belt.
- Although the majority of western and southwestern states remain relatively small milk producers, three are among the top ten. California now ranks as the nation's number two dairy state, after Wisconsin. In 1970, California was in fourth place, following Wisconsin, New York, and Minnesota. Last year's production figures put Texas in eighth place, and Washington in tenth. Since 1970, Washington has bypassed Missouri, Illinois, Kentucky, Indiana, and Tennessee.
- Only two states registered increases greater than 100 percent. Arizona's production more than doubled, propelling it from 39th to 26th place among the 50 states between 1970 and 1984. Milk output in New Mexico more than tripled, moving it from 40th place to the 31st spot in 1984.

Studies suggest that there are more profits to be made on the large-scale dairies of the West and Southwest.

Pursuing Population

Population patterns may explain part of this shift, Fallert says. Although processed dairy products are commonly shipped across country and around the world, fresh fluid milk rarely travels more than a few hundred miles. Rapid population growth in California, Texas, and other parts of the West and Southwest created a demand for more locally produced milk.

Wisconsin Is Still Far Ahead, But California Has Narrowed the Gap

Top ten states in 1984 milk production	1984	1970
	millions of pounds	
Wisconsin	23,501	18,435
California	15,278	9,457
New York	11,405	10,341
Minnesota	10,331	9,636
Pennsylvania	9,423	7,124
Michigan	5,350	4,602
Ohio	4,600	4,420
Texas	3,850	3,065
Iowa	3,805	4,670
Washington	3,464	2,091
Ten-state total	91,007	73,841
U.S. total	135,444	117,007

Milk production shifts closely mirror the population patterns for the two groups of states highlighted on the accompanying map.

The nine western and southwestern states with large increases in milk production provided nearly 22 percent of the nation's milk last year. In 1970, they accounted for just 16 percent of total U.S. milk production. Over essentially the same period, their combined population rose by 14 million, climbing from 20.5 to 23.8 percent of total U.S. population.

The figures are almost exactly reversed for the nine midwestern states stretching from Nebraska, Kansas, and Oklahoma east to Ohio and Kentucky. Their share of U.S. milk production dropped from close to 21 percent in 1970 to 16 percent last year. Meanwhile, their combined population rose by less than 3 million, and their share of total U.S. population actually declined from 21.6 to 19.9 percent.

Regional population is important, of course, but it is not the only factor that influences how much milk is produced in each part of the country. Although the fluid milk market is somewhat dependent on a not-too-distant consumer population, about half of the overall milk supply is used to produce less perishable products, such as cheese, butter, nonfat dry milk, and ice cream. This gives farmers and investors some flexibility in determining where to locate dairy farms, assuming the processing facilities will also be available.

Dairy farming is a business. When businesses have some locational flexibility, they tend to go where profits can be made.

Pursuing Profits

Studies indicate that the profits to be made on the large, new dairy operations in the Southwest are, in general, much better than profit opportunities on the

smaller farms predominant in the northeastern quarter of the nation.

A recent Economic Research Service report examined costs and returns on several hypothetical farms representing typical dairy operations of varying sizes in Minnesota, Arizona, New Mexico, and Washington. The results of the four-state study pointed out "the marked advantage in terms of fewer investments per cow that large-scale dairies have in New Mexico and Arizona compared with smaller Minnesota dairies."

Climate is one major difference. Colder northern temperatures, for example, require a larger investment in dairy buildings.

"In the Southwest," Fallert says, "they don't need the insulated or heated barns to protect the animals in cold weather. All they may need are sun shades that give the animals some cover in hot weather."

Controlling hay and forage quality is another climate-related disadvantage of producers in more traditional dairy areas. In the Southwest, the land is irrigated, says Fallert. "They can shut off their irrigation systems for 3 days and make hay. In the upper Midwest, weather may keep them out of the fields, or they may harvest the hay only to see it soaked by a downpour."

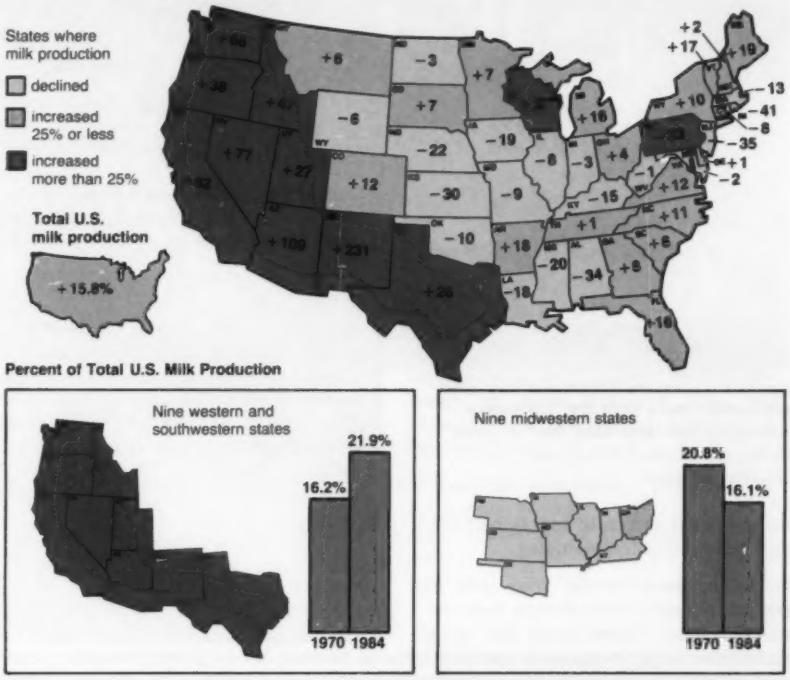
Higher rainfall and humidity also increase mud and waste-handling problems in the Midwest.

Water is a concern for southwestern operations, but Fallert indicates that federal water subsidies have kept the cost down. "One big question," he says, "is how competitive the Southwest might be if dairy producers there had to pay a higher proportion of the actual water cost."

Boyd Buxton, an ERS economist stationed at the University of Minnesota, St. Paul, offers an answer. "Although subsidized irrigation water enhances the competitive position of the Southwest," he says, "our research indicates that those areas would still come out somewhat more profitable even if their water costs tripled."

Milk Production Has Declined in the Nation's Midsection, While Increasing Sharply in the West and Southwest

Percentage changes in milk production, 1970-84:



Percent of Total U.S. Milk Production

Economies of Size and Specialization

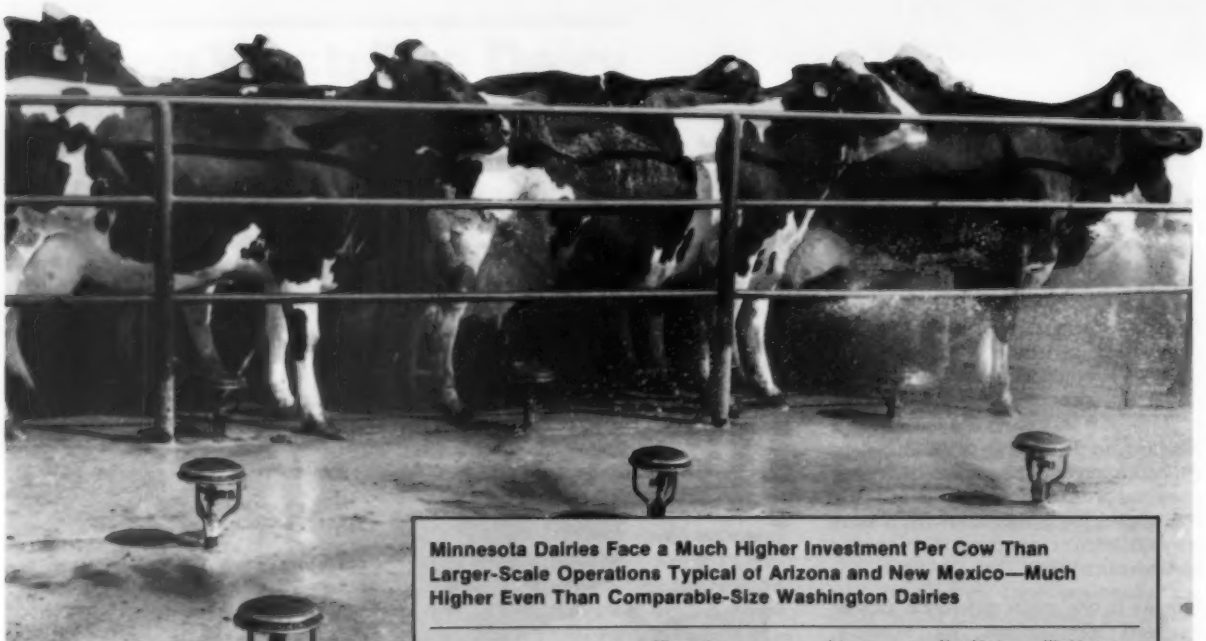
The comparative advantage of southwestern dairies goes beyond climate. Their larger average size affects their profitability. So do their greater milk yields per cow and the management practices and technologies that distinguish them from typical midwestern dairy farms.

Large-scale drylot dairies of 1,000 cows or more are fairly common in California, Arizona, New Mexico, even Florida. A 150-cow dairy is considered large in the northern states.

Of dairies with 500 or more cows, nearly 600—or more than half the nation's total—were in California when the 1982 Census of Agriculture was conducted. New Mexico had 32 of these operations, more than Wisconsin, New York, Minnesota, and Pennsylvania combined.

"The large, drylot dairies of the Southwest seem to show some economies of specialization and more intensive use of facilities," says Fallert. Because of the large number of cows per farm, they can operate 24 hours a day, with milking in three shifts. By contrast, midwestern farms generally milk twice a day, once in the a.m. and once in the p.m., leaving the milking parlor and equipment idle much of the time.

Southwestern dairies are also more likely to specialize, concentrating strictly on milking cows. Observers say they have a reputation for good, close



Sprinklers wash the udders and then cows are herded into a "drip dry" pen before milking on this large dairy farm in Chino Valley, California. *Photo courtesy of Hoard's Dairyman.*

Minnesota Dairies Face a Much Higher Investment Per Cow Than Larger-Scale Operations Typical of Arizona and New Mexico—Much Higher Even Than Comparable-Size Washington Dairies

	Minnesota		Arizona		New Mexico	Washington
	52 cows	125 cows	369 cows	1,436 cows	900 cows	140 cows
			dollars			
Investment per cow in:						
Dairy buildings/equipment	3,874	2,471	1,344	1,116	868	1,869
Tractors and vehicles	1,043	693	220	200	190	443
Field machinery	1,433	633	0	0	0	289
Cattle	2,000	2,000	2,022	2,014	2,033	2,000
Land	5,605	5,565	110	107	261	1,714
Milk base	0	0	1,218	1,218	0	88
Total	13,955	11,362	4,914	4,655	3,472	6,203

[1] Assumed investment requirements for hypothetically typical dairy operations, 1981, from the report *Milk Production: A Four-State Earnings Comparison* by economists Boyd Buxton, Tom McGuckin, Roger Selley, and Gayle Willett, published in February 1985 by the Economic Research Service.

management and rapid adoption of new milk production technologies.

Unlike northern dairies, they tend to purchase most of their forage and concentrate feed. Fallert notes that large California dairy co-ops and feed companies bring in unit trains of grain from the Midwest to supplement the high-quality hay that is available locally, primarily from farms that specialize in hay production.

"The hay market in that part of the country is dependable and robust," he says. "A dairy can add another 50 or 100 cows and know that enough hay will normally be available."

Northern dairies typically raise much of the feed right on the farm. That means more investment in field equipment and feed storage facilities, and it may also mean less-than-full management attention to the dairy side of the business.

"In the Midwest, dairy producers usually spread their time and attention over more activities, from milking and caring for the cows to raising forage and often producing their own grain," Fallert says. "When you're producing your own grain and the planting or harvesting season hits, it's very hard to coordinate the labor-intensive dairy operation with a cash grain operation. Where do you find the 4 to 5 hours to milk your cows when you have to be on a tractor in the fields?"

More Milk Per Cow

All these differences—climate, size, technologies, and specialization—translate into higher average milk yields per cow in the West and Southwest.

The five leading states in milk yield are Washington, California, New Mexico, Arizona, and Nevada. While Wisconsin, New York, and Pennsylvania producers got an average of 12,000-13,000 pounds of milk per cow in 1984, average output was over 14,000 pounds in Nevada and Arizona, more than 15,000 pounds in New Mexico and California, and above 16,000 pounds in Washington.

In 1970, California produced about half as much milk as Wisconsin. Today, it produces nearly two-thirds as much milk, and it does this with only one-tenth the number of dairy farms as Wisconsin and only about half the milk cows. The explanation is more cows per farm and more milk per cow.

USDA analysts note that the limited capacity of California's milk processing plants has actually restrained its expansion in milk production. Much of the cheese consumed in California still comes in from out of state, especially from Wisconsin. The Golden State's dairy industry has recently moved to build up its cheese manufacturing capacity, Fallert says, and California is likely to become less dependent on

other states for processed dairy products. In fact, California might eventually challenge Wisconsin's pre-eminent position as the number one dairy state, he says.

Diminishing Numbers

Although milk production increased more than 10 percent in the last two decades, the number of U.S. farms with milk cows declined from nearly 2 million at the end of the 1950's to about 300,000 in 1983. The fewer but larger trend in dairying paralleled an overall pattern in U.S. agriculture and for many of the same reasons.

Yet the dairy sector was also changing in response to other developments that influenced the gradual flow of milk out of some areas and into others.

"Relatively high grain prices in the 1970's probably accelerated the shift to crop production in the Corn Belt," Fallert says. "At the same time, urbanization raised land costs and opened up new off-farm employment opportunities, particularly in the Northeast." The rising requirements and costs of pollution control reinforced the trend, fostering the virtual disappearance of dairying as a sideline activity in northern states.

More profitable alternatives in grains may help explain why large-scale dairies didn't catch on in the Midwest during the 1970's. They may also explain why cash grain states, such as Iowa, registered declines in milk production, while Wisconsin and Pennsylvania chalked up fairly substantial increases. A related reason may have a sociological base, Fallert speculates.

"Wisconsin and Pennsylvania are more uniform dairy areas. In a cash grain state, it may be more difficult, especially for the younger people, to sacrifice their Saturday evenings and possibly their vacations to do the milking when they can see that the grain farm down the road doesn't require the same year-round, dawn-to-dusk attention."

While many midwestern states were cutting back on milk production, state-of-the-art dairies were being built on the fringes of metro areas in California and Texas. As population expanded and moved outward, the dairies recorded substantial gains in capital appreciation, which they have plowed back into new units farther out and into Arizona and New Mexico, Fallert says.

This is still going on because population has continued to grow in these areas and because many of these dairies are recording handsome gains in asset values at the same time that they're ringing up profits.

The report cited earlier on typical dairy operations in four states came to the following conclusion: "Based on 1981 prices and conditions, results show that investment in large-scale dairies in the Southwest is more profitable than investment in their smaller counterparts in the northern climates. Regional shifts in milk production to the West from traditional areas probably will continue because returns are more favorable in those areas."

But Richard Fallert adds one cautionary note: There may be a risk for the huge dairy operations of the West and Southwest from the limitation on direct payments and other dairy program changes proposed in the Administration's 1985 farm bill.

The large, specialized dairies tend to rely exclusively on milk receipts, and they produce huge quantities, much of which is now sold to the government as butter and nonfat dry milk. Although the processing industry in the region, especially California, is rapidly expanding its cheese-making capacity, there is still substantial butter and nonfat dry milk production for which commercial use is very limited.

For these reasons, Fallert says, the large dairies of the West and Southwest may be somewhat more vulnerable to scale-backs in dairy programs than the smaller, more diversified midwestern dairies. □

[*Based on information provided by economist Richard Fallert and other dairy specialists of the National Economics Division, Economic Research Service.*]

Huge, automated milking parlors operated by union workers—with some herds milked three times a day—are not uncommon on California dairies. *Photo courtesy of Hoard's Dairyman.*

AGRICULTURAL ROUNDUP

Setbacks on the European Front

Last month's cover article on U.S. agricultural exports to the European Community (EC) had more to say than space permitted. Here, in brief, are some of the commodity details that didn't fit. With few exceptions, the details are no more encouraging than the overall picture.

U.S. feed grain exports to the EC plunged 56 percent between fiscal 1981 and 1984, according to Economic Research Service economist Ron Trostle. U.S. wheat and flour exports also fell more than 50 percent, and soybean sales dropped about 30 percent.

Grains and oilseeds account for roughly two-thirds of the value of U.S. agricultural exports to the EC.

U.S. *corn* exports to the EC peaked in 1976 at nearly 16 million tons. Since then, they have declined every year, slumping to only 4 million tons in fiscal 1984. A key reason, Trostle says, is the steadily increasing EC production of coarse grains and feed-quality wheat.

Most Major U.S. Farm Commodities Show Export Value Declines to the EC, But Some Held Steady or Increased

	Fiscal years 1981	1984
	millions of dollars	
Soybeans	2,605	1,795
Feeds & fodders	717	830
Feed grains	1,423	620
Protein meal	788	585
Tobacco	494	476
Cotton[1]	155	309
Nuts & products	304	248
Wheat & flour	465	210
Fruits & products	261	154
Vegetables & products	189	140
Meats & products	254	139
Rice	103	111
Inedible tallow	94	78

[1] Excluding linters

Internal EC prices encourage farmers to feed wheat and barley to livestock in place of imported corn because the EC produces a surplus of both soft wheat and barley. Most of the EC's corn imports from the United States go into starch manufacturing for food and other uses. France is Europe's top producer of corn and has a priority claim whenever an EC member purchases corn for feed use.

Prospects for U.S. corn exports may not improve, Trostle maintains. EC red meat production is expected to climb very modestly, and half the corn fed in the EC goes to poultry—an industry that will probably continue to grow, but at a slower pace than in the past.

Unlike bulk grains, *corn gluten* feed enters the EC free of import levies and has been a major growth area for U.S. exports. Corn byproducts, including corn gluten, accounted for 75 percent of U.S. feed and fodder exports to the EC in 1984. However, the EC wants to impose import restrictions on corn gluten, and the issue is being discussed under the General Agreement of Tariffs and Trade.

Corn gluten is used largely as a feed for dairy cows, so current EC quotas on its milk producers will restrain any expansion in the potential market even without import restrictions. EC milk delivery quotas are in place for 4 more years and may be continued indefinitely, Trostle notes.

Although the EC produces far more soft *wheat* than it needs internally, it still offers a market for hard red wheat from the United States and Canada. The U.S. share of the market, however, has declined sharply as the appreciation of the U.S. dollar gave the price edge to our competitors.

Almost one-third of U.S. exports of *soybeans* and *soybean meal* go to the EC, and about half of the soybean meal fed in the EC comes from the United States. Like corn gluten feed, soybeans and meal can enter the EC without levies, but U.S. sales have been hurt by exchange rates, slower growth in EC livestock production, and subsidized exports from Brazil. In addition, EC rapeseed and sunflower seed production has nearly doubled under generous price supports, displacing soybean meal nearly on a one-to-one basis.

Finally, the availability of skimmed milk powder rose steadily as a result of rapid increases in EC dairy production. The EC subsidizes the use of the powder as a high-protein feed.

Among other products, U.S. export sales declined for *fruits, vegetables,* and *meats* from 1981 to 1984. However, American *cotton* sales increased sharply, and *tobacco* sales held up well. The EC is the world's largest importer of unmanufactured U.S. tobacco, but high tariffs virtually exclude U.S. cigarettes and other manufactured tobacco products.

What about this year's export prospects? Unless the dollar weakens significantly, Trostle cautions that there may be little to boast about, although he can point to one particularly strong bright spot—*almonds*. U.S. prices are competitive, and the 1984 almond crops of Italy and Greece were severely damaged by poor weather. Continued opportunities also exist, he says, for some highly processed convenience foods.

. . . And on the Korean Front

Australian feed wheat and Chinese corn are slicing off a share of U.S. feed grain exports to South Korea.

Taking advantage of lower prices from these competitors, South Korea cut its feed grain purchases from the United States by more than 20 percent in fiscal 1984, from 4.1 to 3.2 million tons. The forecast for U.S. feed grain sales this fiscal year is even lower—2.4 million tons—according to USDA trade analysts.

"In the last 6 months of 1984, South Korea purchased 778,000 metric tons of corn, at a cost of about $100 million, from the People's Republic of China," says economist Maria Elena Pomar of USDA's Economic Research Service.

"A substantial increase in purchases of Chinese corn is expected during 1985," says Pomar. "It is also worth noting that South Korea bought more than 70,000 metric tons of sorghum from China between April 1984 and February 1985, the first such sales on record."

In addition to Chinese corn and sorghum, favorably priced feed-quality wheat is coming in from Australia, says Pomar. Last year, South Korea bought 674,000 metric tons of it.

"Continued low prices for Chinese corn and large stocks of Australian feed wheat will cut into sales of U.S. feed grains, particularly corn, in the year ahead," she predicts.

Female Farmers Gain More Than a Foothold

Female farmers are finding more than a foothold in the male-dominated U.S. farm sector.

Their numbers are growing, even as the overall farm count is coming down.

"In 1982, about 9,000 more farms were run by women than in 1978," says researcher Judith Kalbacher of the Economic Research Service. Kalbacher recently compared results of the 1978 and 1982 Censuses of Agriculture. In those 4 years, the percentage of female farmers grew from 5 to 5.4 percent of all U.S. farmers.

The reasons more women are turning up among the ranks of farm operators aren't altogether clear. No doubt, the gradual aging of the farm population makes for more widows, and many modern widows may be unwilling to sell or rent out the farm after they've lost a husband. Yet even that represents a break with the past.

The greater willingness of women to report themselves as the principal operator may also be a factor. And, finally, observers are relatively certain that the statistics include some young women who feel the call and have the confidence to run a farm.

While female farm operators are staking out a more sizable chunk of American agriculture, many women farmers have yet to feel the comforting assurance of solid ground under their workboots.

"They tend to run smaller farms and earn less than their male counterparts," says Kalbacher. "On the average, they're also older than male farmers."

Women Farmers Face Obstacles

More importantly, she adds, women operators face "the particularly pressing problem of establishing credibility as farmers. Because of the public's reluctance to deal with inexperienced farmers, female operators may encounter obstacles in marketing their products, obtaining credit, hiring farmworkers, or leasing additional farmland."

In 1982, about 9,000 more farms were run by women than in 1978.

According to Kalbacher, women not only face the physical rigor and stress associated with operating a farm, but must also prove themselves to a farm community unaccustomed to thinking of women as agricultural producers.

On the plus side, women farmers tend to carry less total debt than their male counterparts. This is partly related to age and widowhood. In addition, small-scale U.S. farming is generally associated with low debt.

Typical, perhaps, of female farm operators "is the woman who runs a small livestock operation in the South. She's white, just under 60 years of age, and probably a widow. She's likely to be farming because she loves the land and enjoys working around animals."

Livestock operations were the specialty of more than 54,000, or 45 percent, of female farmers. Cash grain farms came in second at about 13 percent of the total, and animal specialties (such as horses) trailed in third place at 8 percent.

The South has half of all female-operated farms. The Midwest ranks second, with about a fourth of all such farms.

Attached to the Land

Females operated a total of 121,599 farms in 1982, accounting for 35.36 million acres, according to the Census of Agriculture. In 1978, the comparable figures were 112,799 farms and 35.34 million acres.

Most of these farms were under 140 acres, but the land usually belonged to the female operators: Fewer than 1 in 10 farmed only rented acreage, and another 13 percent farmed a combination of owned and rented acreage.

The middle and upper age brackets contained more than half the women operators. Many of them were 65 years of age and older—39,203, or roughly one-third of the total. About one-fourth (30,368) were 55 to 64 years old. Fewer than 12,000 were under 34 years of age, the 1982 Census of Agriculture shows. Fewer still were black (3,121) or Hispanic (1,109).

Age and the willingness to carry on, often without spouses, were not the only indicators of a strong attachment to agriculture among women farmers. Most have spent more than 5 years on their present farm, although not necessarily as the operator. More than 50,000 had been on their present farm for longer than 10 years, and the average was around 17 years.

Even though their 1982 sales totaled $2.74 billion, most female-operated farms were small-scale. More than two-thirds had sales of less than $10,000 a year. About 13,000 had annual sales of $10,000 to $19,999, and 24,000 farms earned $20,000 or more. In 1978, only 21,630 female-run farms were in the $20,000-and-up category.

Certainly, the increase is encouraging to younger women who might want to run a farm. What Kalbacher finds most hopeful, however, is the spirit of the women themselves.

"Women farmers have told me that working and owning land gives a sense of pride and self-esteem, that farming is a way of life that gives them a closeness with nature and a feeling of freedom," she says.

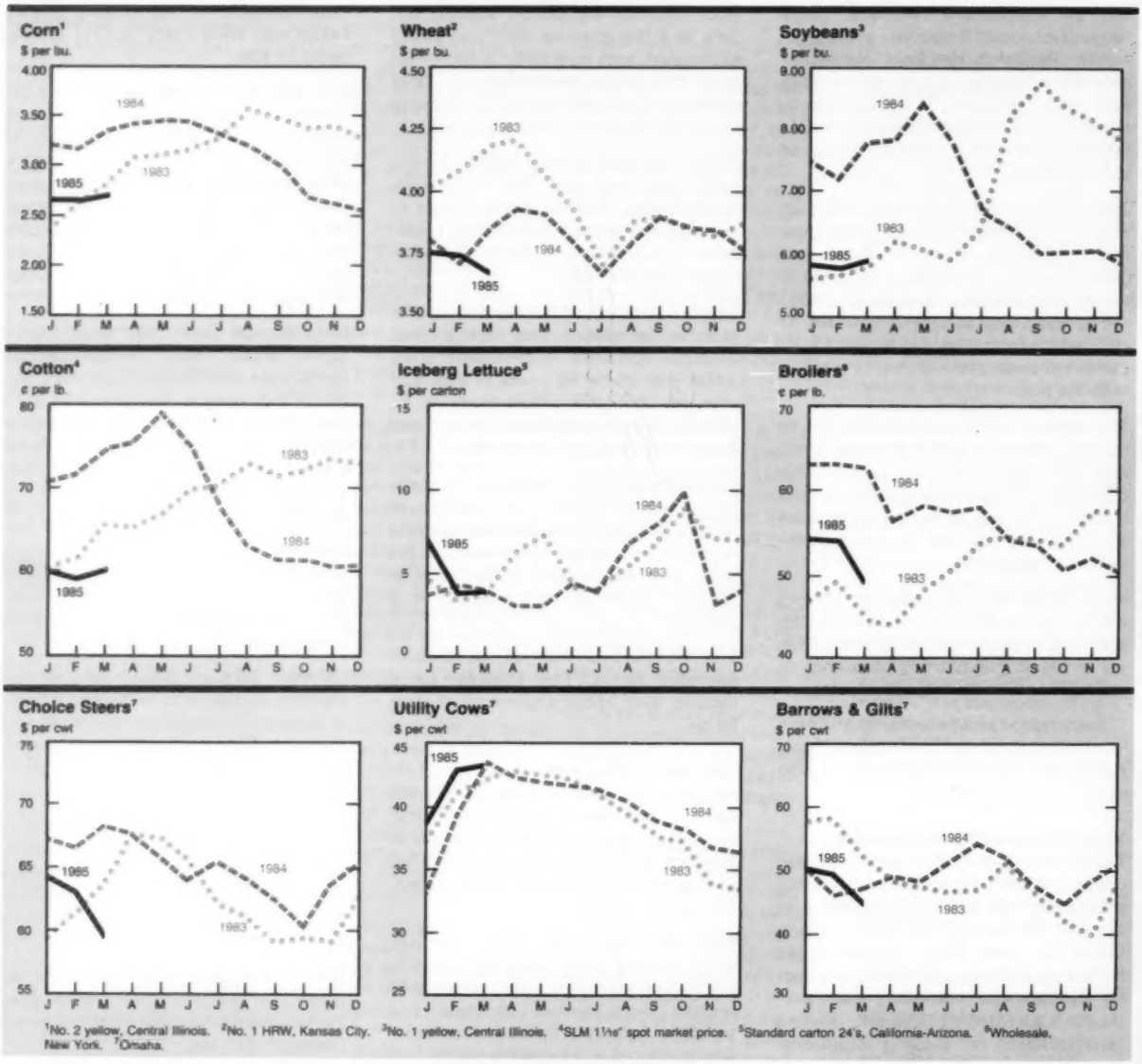
Many women farmers built that connection, and communion, with the land as partners with husbands who have passed away. "They inherited the land, and are carrying on the tradition of the family farm."□

[Based on information provided by researcher Judith Kalbacher of the Economic Development Division, Economic Research Service.]

FARMLINE TRENDS

Monthly Price Monitor

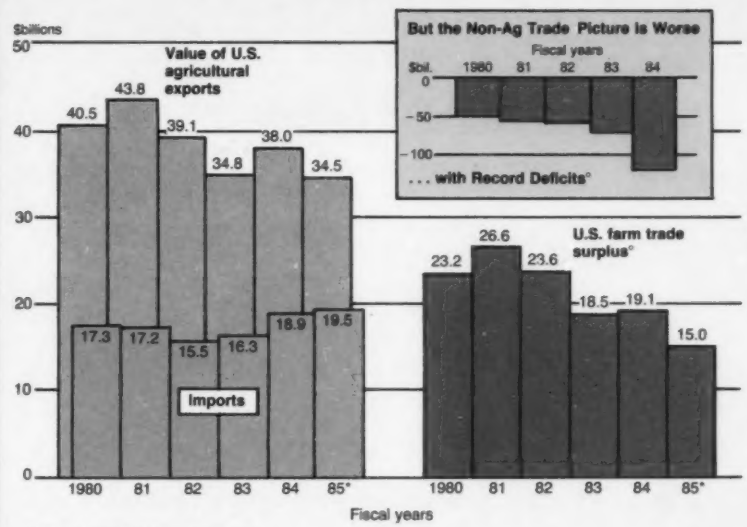
USDA's index of farm prices for March declined 0.7% from February and was 7.6% below its year-earlier level. Corn prices rose 5¢ to $2.69 per bushel, the highest since last September. Wheat fell to $3.67, matching last year's price low. Soybeans at $5.90 topped the 3 previous months but remained well below their year-earlier price. The meat animals area showed lower prices in all categories except utility cows. Broilers dropped below 50¢ a pound for the first time since May 1983. Prices for choice steers and barrows and gilts were at their lowest levels since November 1983. All prices shown are monthly averages.



[1]No. 2 yellow, Central Illinois. [2]No. 1 HRW, Kansas City. [3]No. 1 yellow, Central Illinois. [4]SLM 1 1/16" spot market price. [5]Standard carton 24's, California-Arizona. [6]Wholesale, New York. [7]Omaha.

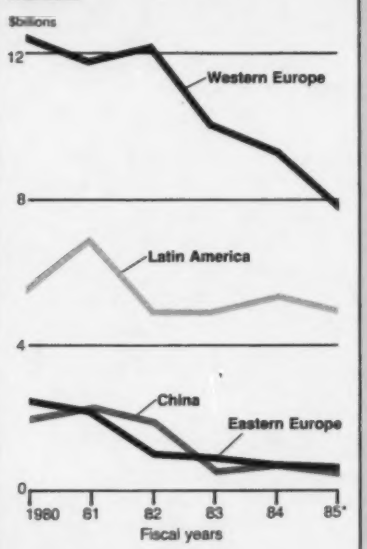
Recent Forecasts Signal No Improvement In This Year's Export Picture

The U.S. Farm Trade Surplus Is Shrinking as Agricultural Export Earnings Remain in a Rut and Imports Edge Upward



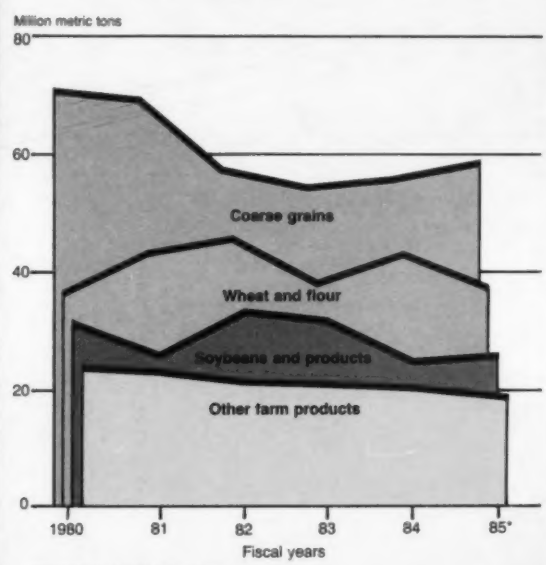
*Value of exports minus value of imports.
*Forecast as of mid-March 1985.

U.S. Farm Product Sales Have Dropped Sharply in Four Large Markets



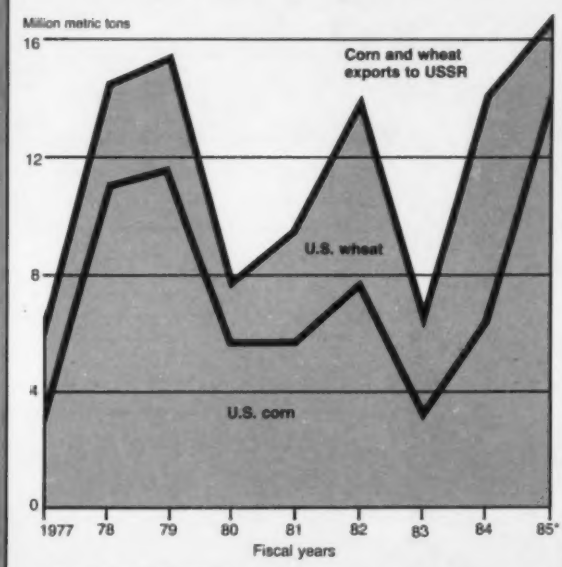
*Forecast.

Export Volume Is Down From Earlier Highs in Mos. Major Commodity Groups



*Forecast as of mid-March 1985.

This Year's Record Soviet Grain Purchases, Primarily of Corn, Have Kept Our Exports from Falling Further



*Sales through mid-March 1985.

Data provided by Stephen MacDonald and other economists of the Economic Research Service.

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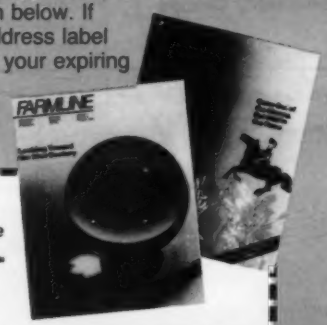

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